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GB 0826198 A WO 92/00120 A1 FR 002657264 A

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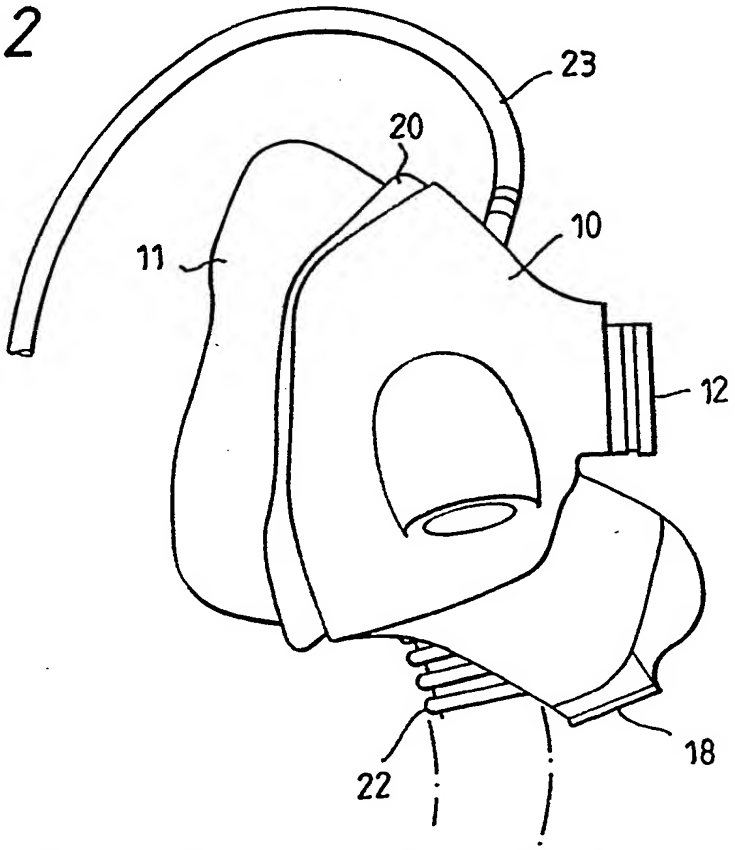
UK CL (Edition K) A5T TCA TCH TCKA TCM TCT TCX
INT CL[5] A62B
Online databases: WPI

(54) An oxygen mask provided with inflation means to tighten fit to the wearer

(57) An oxygen mask includes an exoskeleton 10, a flexible facepiece 11 with an oxygen delivery connection (15), an inflatable bladder 20 positioned between the exoskeleton 10 and the facepiece 15, and means (21, 23) for automatically inflating the bladder 20 when oxygen is delivered under pressure to the mask.

Fig.2



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal c py.

This print incorporates corrections made under Section 117(1) of the Patents Act 1977.

GB 2 262 239 A

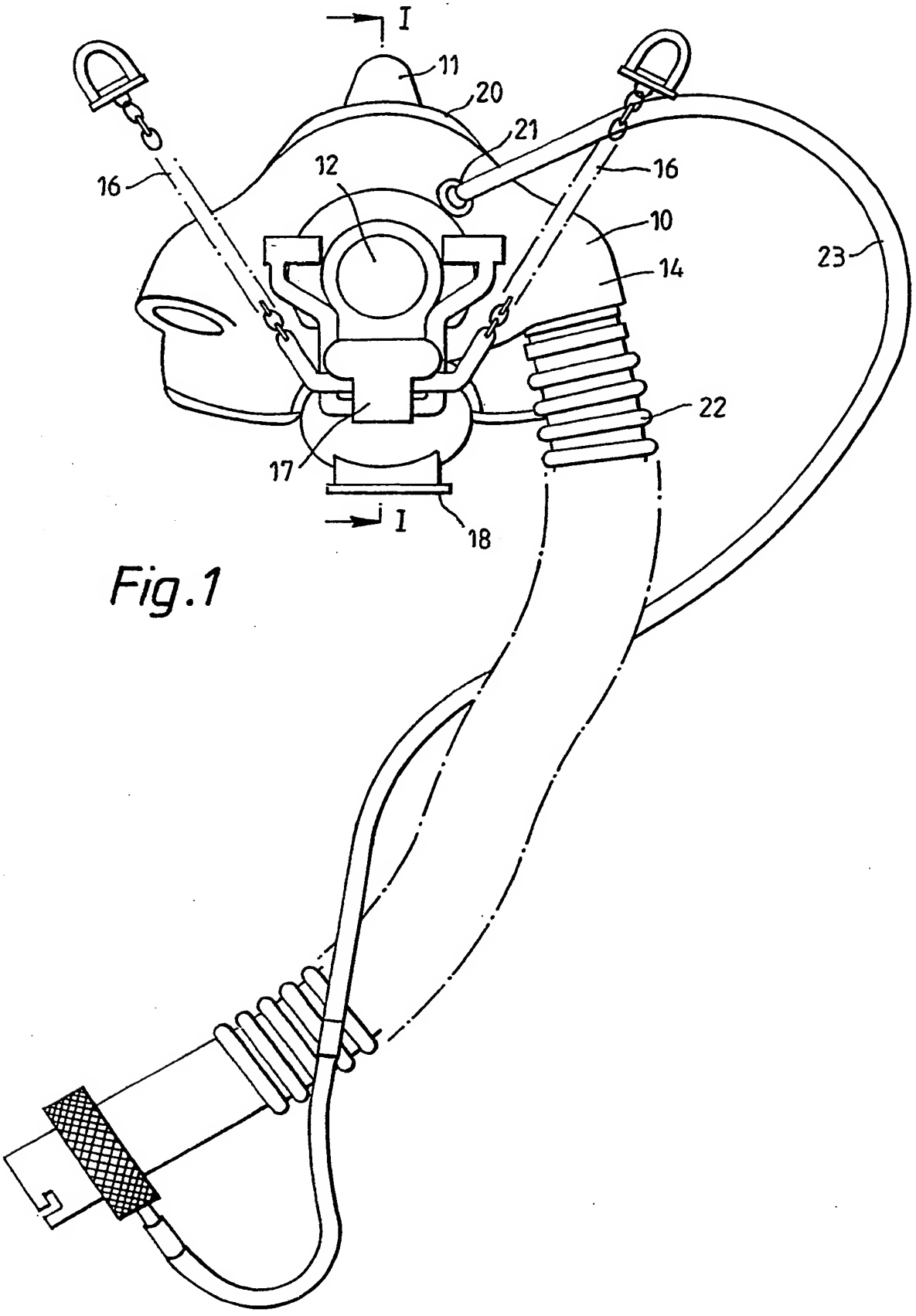


Fig.1

Fig.2

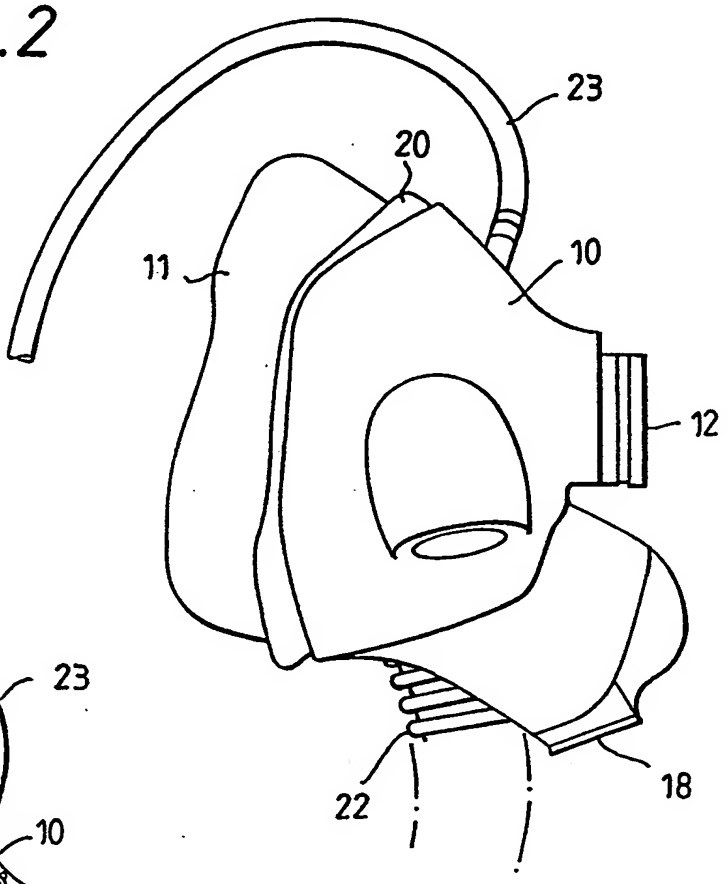


Fig.3

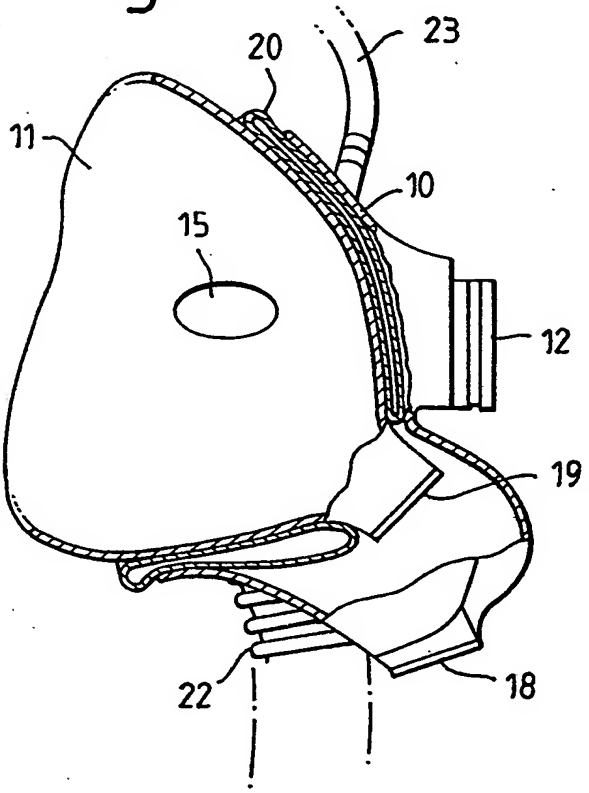
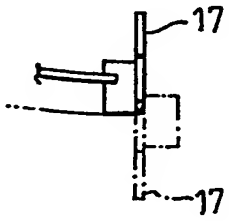


Fig.4



OXYGEN MASKS

The present invention relates to oxygen masks of the type used by military aircrew.

It is well known that human life relies on the absorption of oxygen by the lungs. For absorption to take place the partial pressure of oxygen in the lungs must be above a certain minimum pressure.

It is also well known that one effect of increasing altitude is a reduction in air density (and hence in air pressure). To compensate for this effect aircrew are provided, through specially designed masks, known as oxygen masks, with an air supply having an enhanced, eventually pure, oxygen content. However an altitude, normally about 37,000 feet, is eventually reached where the pressure of even pure oxygen is insufficient for it to be absorbed. To overcome this problem aircraft cabins are pressurised.

The effect of loss of pressure in the cabin of an aircraft flying above the critical altitude is that occupants of the cabin rapidly become hypoxic (from lack of oxygen) and the consequent loss of consciousness can occur very quickly. To cope with this eventuality systems have been developed whereby loss of cabin pressure results in the supply to oxygen masks of pure oxygen at increased pressure relative to ambient pressure, sufficient for it to be absorbed by the lungs in an amount sufficient to prevent hypoxia. For this pressurised breathing to be effective an oxygen mask must clearly form a gas tight seal with its wearer's face. Masks held in position sufficiently tightly to fulfil this condition would be unbearably uncomfortable at this tightness, so masks have been developed which can be tightened when the wearer notices the onset of pressure breathing. Currently used masks each have a rigid exoskeleton, normally of a Fibre (usually glass fibre) Reinforced Plastic Material, to which is attached a flexible face piece. The exoskeleton is attached to a helmet by a mechanism which can be tightened to bring the facepiece into tighter contact with a wearer's face. The conventional arrangement includes a toggle bar which the wearer moves physically with his fingers.

Over recent years, pressure breathing has been introduced to help counter the effects of acc l ration, in addition to the traditional role as a prot ction against hypoxia at high altitude. Thus, modern high speed aircraft, particularly military fighter aircraft, have reached a state of development where the gravitational forces imposed on their crew can reach levels where, were pressure breathing to be introduced whilst manoeuvring, the physical task of tightening the oxygen masks would be difficult or even impossible. There are known oxygen masks designed to tighten automatically when pressure breathing is applied, but these are complicated and expensive, relying on a bladder system, positioned at the rear of the helmet, which upon inflation re-orientates the helmet position and alters the whole geometry of the whole helmet/mask system. This can have a detrimental effect upon any helmet mounted device such as, for example, a weapons sight or visual display.

There is, therefore, a need for a simple and inexpensive automatically tensioning oxygen mask that functions independently of the helmet.

According to the present invention an oxygen mask includes an exoskeleton, means for attaching the exoskeleton to a helmet in a manner allowing a degree of movement relative thereto, the movement being limited to a predetermined maximum distance therefrom, a flexible facepiece with an oxygen delivery connection, an inflatable bladder positioned between the exoskeleton and the facepiece, and means for automatically inflating the bladder when oxygen is delivered under pressure to the mask.

The means for automatically inflating the bladder preferably comprise a connection to the oxygen delivery system.

One embodiment of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings, of which;

Figure 1 is a front elevation of a mask according to the invention,

Figure 2 is a side elevation of the mask shown in Figure 1,

Figure 3 is a side elevation, in section along line I-I of Figure 1, and

Figure 4 is a sketch illustrating the operation of a tightening toggle of a conventional mask.

A conventional oxygen mask for use with a pressure breathing system has an exoskeleton 10, formed of, for example, Glass Fibre Reinforced Plastic (GRP) to which is secured a flexible facepiece 11 made from, for example, silicone rubber. The mask will normally contain radio transmission equipment at position 12, details of which are omitted for clarity.

The exoskeleton 10 has oxygen tube access ports by means of one of which an oxygen tube can be connected via inlet 15 (Figure 2) to the inside of the facepiece 11, and the exoskeleton 10 and facepiece 11 have exhaust valves 18, 19 respectively.

The mask exo-skeleton 10 of the mask has connecting chains 16 by means of which it can be secured to a helmet. The chains 16 are mounted on a toggle system 17 which, in use, can be rotated through 180 degrees (see Figure 4) to tighten the facepiece, via the exo-skeleton, against the face of a wearer (not shown).

In a mask according to the invention the facepiece 11 is secured to an inflatable bladder 20 which itself is secured to the exoskeleton 10. A connector 21 (Figure 1) allows a access to the bladder.

In use a wearer (not shown) dons a helmet (not shown) and attaches a mask to the helmet by means of the chains 16 in the usual way. An oxygen pipe 22 is connected to the facepiece 11 by means of the ports 14, and is also connected by means of a tube 23 and the connector 21 to the bladder 20. Whenever the oxygen system switches to the pressure breathing mode oxygen under pressure will be supplied not only to the wearer via the inside of the facepiece 11 but also to the bladder 20. The bladder 20 will inflate, so forcing the facepiece against the face of the wearer.

It will be realised that many variations are possible within the scope of the invention. For example an independent gas supply, preferably operated by the same actuation means as the pressurised oxygen supply, may be used for pressurising the bladder. Although more complicated, this arrangement allows for different pressurisation levels of the oxygen to the user and of gas to the bladder.

Whilst the chains 16 are illustrated as being attached to a toggle 17 this may be dispensed with in masks according to the invention, with the chains 16 being attached directly to the exoskeleton 10. Alternatively the toggle 17 may be retained as a back-up in case of failure of the bladder 20.

Versions of the mask other than for attachment to a helmet are possible.

Preferably the bladder 20 should cover the maximum area of the facepiece 11 , though clearly some uncovered areas must remain to allow, for example, for an exhaust valve.

CLAIMS

What is claimed is:

1. An oxygen mask including an exoskeleton, means for attaching the exoskeleton to a helmet in a manner allowing a degree of movement relative thereto, the movement being limited to a predetermined maximum distance therefrom, a flexible facepiece with an oxygen delivery connection, an inflatable bladder positioned between the exoskeleton and the facepiece, and means for automatically inflating the bladder when oxygen is delivered under pressure to the mask.

2. An oxygen mask as claimed in Claim 1 wherein the means for automatically inflating the bladder comprise a connection to the oxygen delivery system.

3. An oxygen mask as claimed in Claim 1 or in Claim 2 wherein the exoskeleton is attached to the helmet by means of a chain.

4. An oxygen mask as claimed in any one of Claims 1 to 3 wherein the exoskeleton is attached to the helmet by means including a toggle arrangement.

3. An oxygen mask substantially as herein described with reference to Figures 1 to 3 of the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number
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Relevant Technical fields

(i) UK Cl (Edition L) A5T TCH,TCM,TCT,TCX,TCKA,TCA

(ii) Int Cl (Edition 5) A62B

Search Examiner
J A WALLIS

Databases (see over)
(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search
5 JANUARY 1993

Documents considered relevant following a search in respect of claims 1 AT LEAST

Category (see over)	Identity of document and relevant passages		Relevant to claim(s)
A	GB 826198	(FRANKENSTEIN ETC) whole document relevant	All
X	FR 2657264 A1	(ULMER ACRO) NB Figure 3	All
X E	WO 92/00120 A1	(CAM LOCK) whole document relevant	All

Category	Identity of document and relevant passages - 7 -	Relevant to claim(s)

Categories of documents

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E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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